Appendix E – Supplementary Information for Cumulative Impacts Analysis

This appendix summarizes potential cumulative impacts associated with Hanford Site land-use designations for each alternative identified in Chapter 3. Cumulative impacts result

> *. . . from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time . . .* (40 CFR 1508.7).

Reasonably foreseeable actions are identified and the relationship between these actions and the proposed land-use designations is discussed. The description of potential cumulative impacts couples impacts of each alternative with impacts from past and existing operations at the Hanford Site and impacts that may be associated with anticipated future actions.

Cumulative impacts to land use associated with present and reasonably foreseeable actions are discussed in Chapter 5, Section 5.5.1. Section 5.5.2 discusses potential cumulative impacts to the resources identified in Section 5.2; and Sections 5.5.3 and 5.5.4 discuss cumulative socioeconomic impacts and cumulative human health risk, respectively.

E.1 Past, Present and Reasonably Foreseeable Future Actions at the Hanford Site

This section describes additional, past, present and reasonably foreseeable actions that might not be fully implemented yet at the Hanford Site where potential impacts have been identified.

E.1.1 Wahluke Slope

The current management of lands within the Wahluke Slope is comparable to Preservation and Conservation. No new actions are presently planned for the Wahluke Slope, and DOE anticipates that the present management would continue under the No-Action Alternative. However, adoption of the alternative selected in the U.S. Department of the Interior (DOI) Record of Decision (ROD) for the *Hanford Reach of the Columbia River Final Environmental Impact Statement for Comprehensive River Study* (DOI 1996) would designate the Wahluke Slope as a wildlife refuge. This DOI designation requires Congressional action and the wildlife refuge would be managed similarly to the Preservation designation used in this Final HCP EIS. There are two proposals currently under consideration in Congress. The primary differences between the proposals include the extent of the geographic scope (i.e., whether the Wahluke Slope is addressed or not), and the designation of the land manager (local versus Federal control).

The DOE Preferred Alternative and Alternative One would designate the Wahluke Slope as Preservation as an overlay National Wildlife Refuge. Alternatives Two, and Four would designate the area for Preservation. Alternative Three would designate a large portion of the area for Agriculture, with the smaller areas designated for Conservation and Preservation. Small areas would also be designated for recreational use (High- and/or Low-Intensity) under all alternatives except Alternative Two. High-Intensity Recreation and Agriculture would not be consistent with the alternative selected in the DOI ROD for the Hanford Reach.

To the extent that DOE retains control of the Wahluke Slope, future actions in the Wahluke Slope would be consistent with the land-use designation adopted through the ROD for this Final HCP EIS. |

E.1.2 Columbia River Corridor

Present and reasonably foreseeable actions with the Columbia River include the following actions:

- ***Hanford Reach of the Columbia River Final Environmental Impact Statement for Comprehensive River Record of Decision* (DOI 1996)**: This EIS addressed the need to protect the Hanford Reach as the last free-flowing, nontidal stretch of the Columbia River in the United States. The ROD selected the alternative that combined a Wild and Scenic River designation for the Hanford Reach of the Columbia River and its immediate corridor with a National Wildlife Refuge (NWR) designation for the Wahluke Slope (NPS 1994). Recreational access points would be improved but not expanded, and additional facilities and programs for visitor interpretation and education would be provided. Damming and major dredging would be prohibited. Development of new industrial facilities on the Hanford Site within the immediate river corridor would be curtailed. Other DOE activities would be specifically allowed or be subject to review and approval. The following potential impacts and benefits were identified (NPS 1994):

  -- Prohibiting damming and dredging would ensure favorable conditions for salmon to migrate and spawn; preserve biodiversity and sensitive species by preventing disturbance of habitat; maintain the existing high water quality by reducing siltation; minimize water temperature change and the potential contaminant releases associated with dredging; and would prevent inundation and disturbance of cultural resources.

  -- Ongoing cultural resource inventories and surveys would maintain the quality of historic and archaeological sites, identify new sites, and document existing sites.

  -- Restricting development would reduce river siltation and prevent disturbance of cultural and paleontological resources.

  -- Controlling exotic vegetation would prevent this vegetation from crowding out native plants. Controlling nuisance aquatic macrophytes, such as water milfoil, would reduce the impacts of these plants on water quality and aquatic habitats. Revegetating disturbed areas with native plant species would restore the diversity and abundance of native plant and animal communities.

  -- Prohibiting off-road vehicle use would prevent disturbance of riparian and upland habitats and cultural resource sites.

  -- Prohibiting grazing would minimize further damage to upland and riparian habitats, but would impact tribal access for the purpose of grazing animals and private citizens currently holding grazing permits.

  – Increasing river patrols would reduce the impacts of wildfires, littering, and disturbance of rare plants, wildlife, and cultural resources.

– Conducting a study to examine sloughing of the White Bluffs and identifying possible protective actions could lead to reduced sloughing, which would benefit this important visual and paleontological resource. Measures to reduce the sloughing of the White Bluffs could adversely impact current irrigation practices on adjacent lands if irrigation is shown to contribute to the sloughing.

-- The Hanford Reach Study Team intends that the Wild and Scenic River designation would not impose constraints on Hanford Site remediation. New construction would be prohibited within the designated boundaries, with the exception of intakes and outfall structures and required facilities related to remediation of the Hanford Site.

-- Habitat protection and restoration efforts would benefit recreational use and access, as would increased river patrols and improvements in public education efforts and recreational facilities.

In mandating the study in 1988, Congress provided interim protection of the Hanford Reach by prohibiting development until November 1996. In 1996, Public Law 104-333 extended this protection indefinitely. Activities such as damming or dredging have been permanently prohibited. Congress must determine the further disposition of the Hanford Reach study area through legislative action (NPS 1994).

- **Decommissioning of eight surplus production reactors**: An EIS was prepared to address the potential environmental impacts, benefits and costs, and institutional and programmatic needs associated with decommissioning the eight surplus production reactors in this area (DOE 1992a). The ROD for this action was published in 58 FR 48509. The DOE decided on safe storage followed by deferred one-piece removal as the preferred alternative. The DOE intends to complete this decommissioning action consistent with the schedule for remedial action in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989). Therefore, the safe storage period would be for less than the 75-year time frame outlined in the Decommissioning of Eight Surplus Production Reactors EIS. This action includes continuing surveillance, monitoring, and maintenance, followed by transport of intact reactor blocks from the present locations in the 100 Areas to the 200 West Area for disposal. Contaminated materials associated with the fuel storage basins also would be disposed of in the 200 West Area, along with contaminated equipment and components associated with the reactors. Uncontaminated portions of the fuel storage basins would be removed to provide access for machinery required to move the reactor blocks. Other uncontaminated structures and equipment would be demolished and placed in landfills in the vicinity of the reactor sites.

  Occupational radiation doses associated with this action were estimated to be approximately 51 person-rem, and short-term public radiation doses were estimated to be near zero (DOE 1992a). Near-term ecological impacts were considered minimal because of the existing disturbance from other radioactive waste management activities and nuclear facility operations. The maximum number of workers required at any time would be less than 100. Portions of the B Reactor may be preserved for display in recognition of the cultural significance of the reactor.

  Approximately 6 ha (15 ac) in the 200 Areas would be disturbed to accommodate disposal of wastes resulting from decommissioning activities. This disturbance would be partially offset by the 5 ha (13 ac) that would be available for revegetation in the

100 Areas after removal or dismantlement of the eight reactors. Additional habitat disturbance would be required for construction of haul roads from the 100 Areas to the 200 Area that are capable of handling the movers required to transport the reactor blocks.

- **Deactivation of the N Reactor**: An environmental assessment (EA) was prepared to address all nonroutine activities associated with the shutdown of the 105-N Reactor (N Reactor) (DOE 1995e); the finding of no significant impact (FONSI) was issued on May 1, 1995. The EA identifies impacts associated with activities required to prepare the reactor for decommissioning. No additional ground disturbance would be anticipated from deactivation of the reactor. The maximum exposed individual (MEI) in the offsite population would receive a dose less than 0.001 mrem/yr and the collective dose to the population would be 0.025 person-rem. Deactivation would require approximately 200 workers for three years, with only three workers required after deactivation was complete.

These actions are consistent with and would enable the land-use designations under all alternatives.

E.1.3 Central Plateau

Present and reasonably foreseeable actions in the 200 Areas include the following:

- **Office of River Protection:** The DOE has issued a ROD for an EIS that analyzed alternatives for remediating the waste currently contained in the 177 single-storage tanks (SSTs) and double-storage tanks (DSTs) in the 200 Areas and in about 60 active and inactive miscellaneous underground storage tanks, and providing for safe storage and disposal of strontium and cesium capsules used in research projects at Hanford Site and offsite locations (DOE and Ecology 1996). The EIS evaluated a range of waste retrieval and removal and in-place remediation options for the SSTs and DSTs. The ROD presented the selected alternative of phased implementation and deferred the decision on disposition of cesium and strontium capsules (DOE 1997). Under phased implementation, tank wastes would continue to be stored until the waste is retrieved in a demonstration phase (Phase I) to verify that treatment processes will function effectively. After Phase I, the full-scale production phase (Phase II) would be implemented. Potential impacts associated with this project include worker exposures to radiological and hazardous constituents during waste disposition and habitat disturbance.

- Worker exposures to hazardous and/or radioactive constituents were evaluated in the EIS. It is estimated that health effects due to radiation exposure would include approximately three latent cancer fatalities in operational workers over the life of the project.

  Approximately 138 ha (340 ac) of shrub-steppe habitat would be disturbed.

- **In 1997, DOE prepared a supplement analysis to determine if additional NEPA review was required for a series of tank farm infrastructure upgrades (DOE-RL 1997a):** These upgrades focus on capital improvements necessary for continued safe operation of DST facilities and selected SST facilities. Most of the activities would involve replacing or upgrading existing systems. In May 1997, DOE determined that the potential impacts of the project were adequately bounded by the analysis in the Tank Waste Remediation System (TWRS) EIS; therefore, an additional *National Environmental Policy Act of 1969* (NEPA) analysis was not required.

- **Plutonium Finishing Plant stabilization:** The DOE has issued a final EIS addressing stabilization of the radioactive materials present in the Plutonium Finishing Plant (PFP) (DOE-RL 1996a). Potential impacts include worker exposure and radiological air emissions. All activities will take place within the facility. There will be no change in land use. |

- **Environmental Restoration Disposal Facility (ERDF):** The ERDF was constructed adjacent to the 200 Areas and started operation in August 1996. The facility provides for storage and disposal of waste generated during environmental restoration activities at the Hanford Site (EPA 1995b). The ERDF is the disposal facility for most of the waste excavated during remediation of waste management units at the Hanford Site. Waste generated from remediation of past-practice waste sites and CERCLA remedial activities is placed in the ERDF. The facility accepts only waste that originates on the Hanford Site, which includes dangerous waste, radioactive waste, and mixed waste. The ERDF will be expanded, as needed, ultimately covering as much as 4.1 km^2 (1.6 mi^2) south of the 200 Areas. Initial construction involved 65 ha (165 ac) of this area. In August 1997, DOE, the U.S. Environmental Protection Agency (EPA), and Ecology proposed to expand the existing two operating cells of the ERDF by initiating construction of two additional cells (DOE-RL 1997b). This expansion would require an additional 28 ha (70 ac) within the original ERDF footprint. The original cells were constructed using a double-liner with a leachate collection and recovery system. The new cells would be constructed using the same design.

  Under current climate conditions, contaminants placed in the ERDF are expected to reach groundwater within 10,000 years. After 10,000 years, estimated human health risks are a maximum incremental lifetime cancer rate (ILCR) of 5×10^{-6} and a maximum hazard quotient for noncarcinogens of 0.2 (a hazard quotient of 1 or greater indicates a health concern). Ecological impacts will occur at the ERDF site and at quarries for materials to be used in the liner and cover. The shrub-steppe habitat at the ERDF site is considered priority habitat by the State of Washington and a number of Washington State monitored or candidate species may be affected by the ERDF. The estimated disturbed area ranges from 14 to 54 ha (35 to 133 ac) for the silt quarry (McGee Ranch). The total disturbed area at the actual ERDF site (including the trench, stockpiling areas, roads, and supporting facilities) is estimated to be 260 ha (640 ac), or approximately 2.6 km^2 (1 mi^2). Significant cultural resources have not been identified at the ERDF site. Operation of the ERDF provides up to 167 full-time positions at the Hanford Site. The total estimated capital costs for the ERDF range from $246 million to $663 million. Visual and noise impacts of ERDF construction and operation are considered negligible.

- **Programmatic Spent Nuclear Fuel Management:** The DOE developed the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement* (DOE 1994a) and issued the ROD (60 FR 28680). This decision establishes DOE policies for the environmentally safe transport, storage, and management of spent nuclear fuels. A large portion of the DOE-owned inventory of SNF is already stored at the Hanford Site, and the Hanford Site has been identified as a participant in the management of spent fuel. The selected alternative – regionalization of SNF storage by fuel type – requires management of defense production spent fuel at the Hanford Site and transport of other spent fuel currently stored at the Hanford Site to the INEEL.

An amendment to the ROD (61 FR 9441) was issued to the public on March 8, 1996, to reflect modifications to the original decision resulting from a settlement agreement reached by DOE, the State of Idaho, and the U.S. Department of the Navy. The amended ROD indicates that only 12 of the originally planned 524 shipments of SNF would be shipped from the Hanford Site to Idaho. These 12 shipments will consist of the sodium-bonded FFTF fuel.

Land disturbance associated with this action at the Hanford Site is estimated at 7 ha (18 ac) of shrub-steppe habitat west of the 200 East Area. Estimates of employment required for construction activities range from 176 to 1,065 employees during the years from 1997 to 2000. Operations would require 208 to 230 employees through 2004, with levels gradually declining to 50 to 60 workers beyond the year 2004. Many of these employees would be drawn from the existing Hanford Site workforce. Construction of the new facilities is not expected to have any significant impact on cultural resources. Solid waste generation would be a maximum of 330 m^3/yr (11,654 ft^3/yr), or approximately 4 percent of the 21,000 m^3/yr (740,000 ft^3/yr) currently generated at the Hanford Site. The MEI in the general population would receive a dose of 0.007 to 0.02 mrem/yr from waste-processing activities. Resource (e.g., materials, fuels, and public funds) required to implement this action would overlap with the time periods when the same type of resources would be required by remediation activities at the Hanford Site.

- **Hanford Spent Nuclear Fuel Management:** A Hanford Site EIS was prepared to tier from the ROD (60 Fed. Reg. 28680) for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement* (DOE 1994a). The EIS analyzed the potential environmental impacts of the removal of SNF from the K Basins and subsequent management of the fuel for up to 40 years (DOE 1995d). The ROD for management of K Basin SNF was issued on March 4, 1996 (61 FR 10736).

  The ROD indicates that the Preferred Alternative identified and analyzed in the EIS, with minor modifications, will be implemented. This alternative consists of removing the SNF from the basins, vacuum drying, conditioning, and sealing the SNF in inert gas-filled canisters for dry vault storage in a new facility to be built at Hanford for up to 40 years, pending decisions on ultimate disposition. The K Basins will continue to be operated during the period over which the alternative is implemented. The action also includes transfer of the basin sludge to Hanford DSTs for management, disposal of non-SNF debris in a low-level burial ground at the Hanford Site, disposition of basin water, and deactivation of the basins pending decommissioning. A total of 3.5 ha (8.7 ac) of land and native vegetation would be disturbed or destroyed during land-clearing activities to provide new facilities for this project.

- **200 Area Effluent Treatment Facility:** In 1992, DOE prepared an EA and FONSI (DOE 1992b) that addressed environmental upgrades to liquid waste effluent systems, including the 200 Area Effluent Treatment Facility, located near the 200 East Area. This facility provides effluent treatment and disposal capability required to restart the 242-A Evaporator, which reduces tank waste volume by removing process condensate. The Effluent Treatment Facility provides for effluent collection, a treatment system to reduce the concentration of hazardous and radioactive waste constituents in the effluent streams to acceptable levels, tanks to allow verification of effluent characteristics before discharge, and a state-approved land disposal structure (SALDS) for effluents. The SALDS infiltration gallery consists of a 35- by 61-m (116- by 200-ft) rectangular drain field that is located north of the 200 West Area.

Environmental impacts associated with this project include habitat destruction associated with the construction of the treatment facility, transfer piping, and the SALDS; and the discharge of small quantities of contaminants to the ground through the SALDS. In particular, the discharge of tritiated streams is of concern, but because of the relatively short half-life of tritium (12.3 years), the long residence time of the effluent in the groundwater could be expected to be sufficient to attenuate the tritium before it reaches the Columbia River.

- **Operation of Low-Level Burial Grounds:** The low-level burial grounds located in the 200 West and 200 East Areas are an active, permitted RCRA landfill and cover a total area of 225 ha (556 ac). The landfill is divided into eight burial grounds and each burial ground consists of a number of trenches that contain, or will contain, low-level radioactive and mixed waste. Six burial grounds are located in the 200 West Area and two burial grounds are located in the 200 East Area. Impacts associated with operation of the burial grounds include habitat disturbance or loss and the potential for generation of fugitive dust.

  The DOE recently decided to widen one of the trenches in the 218-W-5 Low-Level Burial Ground to accommodate large, packaged low level waste, and to facilitate segregation of low-level waste.

- **Operation of the U.S. Ecology, Inc. Commercial Low-Level Radioactive Waste Landfill for offsite commercial waste:** U.S. Ecology, Inc., operates a radioactive waste landfill that accepts commercially generated low-level wastes from states included in the Northwest low-level radioactive waste compact. U.S. Ecology, Inc., accepted 2,191 m^3 (77,418 ft^3) of naturally occurring wastes and 5,801 m^3 (204,981 ft^3) of low-level radioactive wastes in 1995 (TCH 1996b). The U.S. Ecology, Inc., landfill is located directly east of the ERDF landfill. Habitat disturbance is the primary impact associated with the facility. In February 1997, the Washington State Departments of Health and Ecology determined that an EIS must be prepared under SEPA before the state can make several key environmental decisions regarding this site. These decisions include approval of a site closure plan, renewal of the operating license, and an amendment to the regulations limiting the receipt of naturally occurring and accelerator-generated radioactive materials. Public scoping took place through March 27, 1997, and the draft EIS is currently in preparation.

- **Solid Waste Retrieval Complex, Enhanced Radioactive and Mixed Waste Storage Facility, infrastructure upgrades, and Central Waste Support Complex:** The DOE prepared an EA addressing several waste management projects in the 200 Areas (DOE-RL 1995b). A FONSI was issued on September 28, 1995, that addressed the construction of the solid waste retrieval complex, an enhanced radioactive and mixed waste storage facility, infrastructure upgrades, and a Central Waste Support Complex. These projects will be undertaken in the 200 West Area and involve approximately 36 ha (89 ac), or about 5 percent of the 777 ha (1,920 ac) in the 200 West Area. Most activities will occur in previously disturbed areas. The waste storage facility, however, will be constructed on relatively undisturbed land, resulting in an incremental loss of shrub-steppe habitat essential for species such as the loggerhead shrike and sage sparrow.

  Discharges of nonradioactive liquid effluents could incrementally increase discharges of nonradioactive effluents in the 200 Areas by 43,000 m^3 gal (11 million gal), which would comprise approximately 2 percent of the total discharge. This additional volume is not expected to produce any discernable mounding of the groundwater. Changes in

the movement of underground contaminant plumes also are not expected.

Implementation of the proposed action would not be expected to produce a cumulative socioeconomic impact, and discernable changes in the radiation dose to offsite receptors would not be expected.

- **Tank 241-C-106 sluicing and waste removal:** This project addresses the need to retrieve the high-heat waste in SST 241-C-106 and transfer the waste to DST 241-AY-102. The DOE has identified a need to take this action to eliminate safety concerns with the storage of high-heat waste in Tank 241-C-106, and to demonstrate a tank waste retrieval technology. The removal of the waste would stabilize this tank and eliminate the need to add cooling water. An EA (DOE 1994b) and FONSI were issued in February 1995.

  Tank 241-C-106, which is located in the 200 East Area, has a 31-cm (10-in) -thick dished bottom, and a useable waste depth of approximately 4.8 m (16 ft) at the sidewall. The waste in Tank 241-C-106 consists of 746,000 L (197,000 gal) of sludge that is stratified into two layers. The top layer consists of 655,000 L (173,000 gal) of sludge, containing a sufficient amount of strontium to be considered high-heat waste, which generates approximately 32 kW of heat. The bottom layer consists of 91,000 L (24,000 gal) of low-heat producing hardened material.

  The high-heat waste will be sluiced from Tank 241-C-106 to a DST through a double-encased (pipe-in-pipe design), bermed line. The system will be a closed loop, continuous sluicing process. The scope of the project is to remove 75 percent, at a minimum, of the high-heat waste. Sluicing of underground storage tanks involves introducing a high-volume, low-pressure stream of liquid to mobilize underground storage tank sludge waste before pumping the tank contents. Impacts associated with this action are potential worker exposure concerns.

- **Disposal of decommissioned, defueled cruiser, Los Angeles Class, and Ohio Class naval reactor plants:** This final EIS, prepared by the U.S. Navy, evaluates the potential impacts of disposing of approximately 100 defueled reactor plants from decommissioned naval vessels (Navy 1996). The ROD was published in the *Federal Register* on August 9, 1996. The selected alternative is to dismantle the vessels at the Puget Sound Navel Shipyard and transport the reactor plants, by barge, to the low-level burial grounds at the Hanford Site. The DOE was a cooperating agency in the preparation of this EIS.

- **Plutonium-Uranium Extraction Plant (PUREX)/Uranium Trioxide Plant shutdown**: In 1993, DOE directed Westinghouse Hanford Company to terminate operations at the PUREX Plant and provided guidance to proceed with shutdown planning and terminal clean-out activities. This direction also covered the Uranium Trioxide Plant at completion of the pending shutdown campaign. An EA addressing transfer of the irradiated fuel from PUREX and the N Reactor irradiated fuel for storage at the 105-KE and 105-KW Fuel Storage Basins was prepared (DOE 1995e) and a FONSI was approved on July 12, 1995. The FONSI identified that unprocessed irradiated fuel would be transported from the PUREX Plant and the 105-N Reactor to the 105-KE and 105-KW fuel storage basins in the 100 K Area; the fuel would be placed in storage at the K Basins and eventually would be dispositioned in the same manner as the other existing irradiated fuel inventory stored in the K Basins. A maximum of three railcar shipments of fuel would be made; two fuel shipments from the PUREX Plant and one from the N Reactor would be shipped to the K basins, unloaded, and stored with the existing fuel. The PUREX fuel removal action has been

completed. The 100-N Basin cleanout was completed in 1998.

These activities are consistent with the Industrial-Exclusive designation for the 200 Areas under all alternatives.

E.1.4 All Other Areas

Present and reasonably foreseeable actions in other Hanford areas include the following:

- **Construction and operation of a Laser Interferometer Gravitational-Wave Observatory (LIGO) on the Hanford Site:** An EA was prepared by the National Science Foundation for construction and operation of a LIGO (NSF 1993), and a FONSI was issued in December 1993. The LIGO site occupies approximately 6 km^2 (2.3 mi^2), including a support facility at the vertex of two 4-km (2.5-mi) arms, mid- and end-station buildings along the arms, service roads, parking areas and construction laydown areas. Service roads, running the length of the 4-km (2.5-mi) arms, fragment habitat that exists at the site. The facility will accommodate 10 to 20 permanent staff, with an additional 10 visiting scientists. The LIGO is currently operating.

  The LIGO is located in an area designated for Research and Development in the Preferred Alternative and Alternatives Two and Three, and Conservation in Alternatives One and Four. The LIGO represents a use that is consistent with Research and Development and Industrial use designations.

- **Environmental Molecular Sciences Laboratory (EMSL):** A FONSI for the EMSL EA (DOE 1990b) was issued in 1992. The EMSL would consist of an 18,500-m^2 (200,000-ft^2) building originally proposed for siting on a 12-ha (30-ac) site located near the Columbia River, in the southeast portion of the Hanford Site. On the second day of construction, April 12, 1994, construction crews uncovered human remains thought to be those of American Indians. The DOE immediately halted construction and proposed, consistent with the wishes of local American Indian tribes and with the spirit of the *Native American Graves Protection and Repatriation Act of 1990* and the *American Indian Religious Freedom Act of 1978*, to relocate the site of the facility. Another EA was prepared to address re-siting the facility (DOE 1994c) in the south part of the 300 Area; the FONSI was approved in July 1994. Construction of the facility was recently completed at the new site. Approximately 200 to 250 employees are located at the EMSL, including permanent staff and visiting scientists.

  The EMSL is within an area designated for Industrial development under all alternatives. The EMSL represents a use pattern that is consistent with this designation.

- **Inert/Demolition Waste Landfill (Pit 9):** An EA was prepared for the proposal to construct a waste landfill (Pit 9) to accommodate inert and demolition waste for the Hanford Site (DOE 1995g). The DOE identified a need for convenient and economic disposal capacity of these types of waste to support the decommissioning activities planned for the southern areas of the Hanford Site. The current demolition waste landfill, Pit 10, located approximately 25 m (82 ft) west of Route 4S, reached full capacity in 1995. The projected decommissioning activities on the Hanford Site will continue for up to 20 years; therefore, a replacement demolition landfill is required in the near-term. The DOE proposed to use an existing alluvial gravel pit – Pit 9 – as a new inert and demolition waste landfill for the Hanford Site. Pit 9 is located approximately 3 km (1.9 mi) north of the 300 Area, in the 600 Area. Based on current

disposal projections, Pit 9 will be available for inert waste for 20 years. The FONSI for this action was approved May 15, 1995, and Pit 9 has been open and operational since approximately July 1995. Impacts associated with this action include minor habitat disturbances.

Pit 9 is located within an area that is designated for Conservation under the Preferred Alternative and Alternative Three, and this activity is consistent with this designation. However, Alternatives One, Two, and Four designate the location of Pit 9 for Preservation, which is not consistent with the current use of Pit 9 as an inert/demolition waste landfill.

- ***Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility*** (DOE/EIS-0310): The 400 Area, located southeast of the 200 East Area, is the site of the Fast Flux Test Facility (FFTF). The FFTF is a 400 megawatt thermal, liquid metal (sodium-cooled) nuclear research test reactor.that was constructed in the late 1970s and operated from 1982 to 1992. Although not designed nor operated as a breeder reactor, the FFTF operated during these years as a national research facility for the Liquid Metal Fast Breeder Reactor Program to test advanced nuclear fuels, materials, components, systems, nuclear operating and maintenance procedures, and active and passive safety technologies. The reactor was also used to produce a large number of different isotopes for medical and industrial users, generate tritium for the United States fusion research program, and conduct cooperative, international research.

  In December 1993, the FFTF was shutdown due largely at that time from determinations that the facility could not continue to operate economically. In April 1995, defueling was completed and usable fuel is stored on site in fuel storage vessels or in the secure vault at the Plutonium Finishing Plant at the Hanford Site. Unusable spent nuclear fuel (SNF) has been thoroughly washed to remove all sodium residuals, dried, and placed in approved, 50-year Interim Storage Casks on the 400 Area Interim Storage Area pad. In November 1995, the reactor was placed in standby mode with the main cooling system operating at approximately 200°C (400°F) to keep the sodium coolant liquid and circulating to maintain DOE's option to restart and operate the reactor in the future. Essential systems, staffing, and support services are being maintained in a manner that will support either timely restart or deactivation of the FFTF. In January 1997, the Secretary of Energy officially directed that the FFTF be maintained in a standby condition while an evaluation was conducted of any future role the facility might have in the DOE's national tritium production strategy. In December 1998, the Secretary determined that the FFTF would not play a role in the nation's tritium production strategy.

  In May 1999, the Secretary announced that DOE would ask the Pacific Northwest National Laboratory (PNNL) to complete a 90-day study that would resolve outstanding informational needs for the FFTF. Results of this study were completed and documented in a program scoping plan presented by PNNL to the DOE in early August 1999. As a result of this study, the Secretary decided, on August 18, 1999, that DOE would conduct a programmatic *National Environmental Policy Act* (NEPA) review, including an Environmental Impact Statement (EIS), evaluating the potential environmental impacts associated with proposed expansion of infrastructure, including the possible role of the FFTF, for civilian nuclear energy research and development activities; production of isotopes for medical, research, and industrial uses; and production of plutonium-238 for use in advanced radioisotope power systems for future National Aeronautic and Space Administration (NASA) space

missions. The Notice of Intent for this programmatic EIS is planned for publication in the *Federal Register* on September 15, 1999. The Final EIS (FEIS) is planned for completion in the Fall of 2000; a Record of Decision utilizing the NEPA review, including the FEIS, is planned by December 2000.

E.1.5 Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE Reserve).

No new actions are currently planned for the ALE Reserve. To ensure that the ALE Reserve's natural resources would be protected, the U.S. Fish and Wildlife Service (USFWS) manages the ALE Reserve for DOE. This management is comparable to a land-use designation of Preservation, as defined in this Final HCP EIS.

The ALE Reserve is primarily designated for Preservation under all alternatives, except Alternative Three, which designates the ALE Reserve for Conservation (Mining). The Preferred Alternative and Alternative Four also include areas designated for Conservation (Mining). These areas would accommodate the potential for development of a quarry. Land-use designations for the ALE Reserve are consistent with anticipated future actions. The Conservation (Mining) designation under Alternative Three would accommodate a greater range of uses throughout the ALE Reserve. The impacts associated with this designation would be greater than for the Preservation/Conservation (Mining) designation under the Preferred Alternative and Alternative Four, or for the Preservation designation under Alternatives One and Two.

E.2 Other Potential Hanford Site Actions

A number of other proposed actions at the Hanford Site are likely to be proposed and evaluated in the future. Impacts of these projects cannot be considered in this analysis, because impact analyses are not complete and decisions regarding implementation of a preferred action have not been made. These projects may contribute to cumulative future impacts considered in the HCP EIS. No additional actions that may affect cumulative impacts associated with the Columbia River are proposed. However, actions in other Hanford areas may have indirect effects on the river.

E.2.1 Central Plateau

Actions that may contribute to cumulative impacts in the Central Plateau (200 Areas) include the following.

- **Hanford Solid Waste EIS**: The DOE is considering preparation of an EIS to evaluate alternatives for management of radioactive and hazardous wastes generated at the Hanford Site or received at Hanford from offsite generators. The specific waste types to be considered in the analysis include: low-level radioactive waste, mixed low-level radioactive and hazardous waste, transuranic radioactive and mixed waste, hazardous waste, and contaminated equipment and materials for reuse, recycle, or disposal. The EIS would update NEPA analyses addressing ongoing activities, implement associated waste management programmatic RODs, and facilitate site- and program-specific decisions on the future operation of Hanford TSD facilities.

These activities are consistent with the Industrial-Exclusive land-use designation proposed for the 200 Areas under all alternatives.

E.2.2 All Other Areas

Other actions that may contribute to cumulative impacts in the All Other Areas geographic area of the Hanford Site include the *Bonneville Power Administration Transmission System Vegetation Management Program Draft Environmental Impact Statement* (DOE/EIS-0285). This DEIS establishes Planning Steps for managing vegetation across 24,000 km (15,000mi) of power lines and 350 substations in the northwest and would determine the available vegetation control techniques, herbicides used, and acceptable biological impacts.. The Draft EIS was issued August, 1999 and public comment is open until October 9,1999.

An EIS DOE prepared on the disposition of the United States inventory of weapons useable surplus plutonium examined reasonable alternatives and potential environmental impacts for the proposed siting, construction, and operation of three types of facilities for plutonium disposition and determined that Hanford's 400 Area was not a preferred site. The first was a facility to disassemble and convert pits (a nuclear weapons component) into plutonium oxide suitable for disposition. The facility would have been located at either the Hanford Site, INEEL, Pantex Plant, or Savannah River Site (SRS). The second was a facility to immobilize surplus plutonium in a glass or ceramic form for disposition in a geologic repository pursuant to the Nuclear Waste Policy Act. The second facility would have been located at either the Hanford Site or the SRS and included a collocated capability to convert nonpit plutonium materials into a form suitable for immobilization. The third type of facility would have fabricated mixed oxide (MOX) nuclear fuel from plutonium oxide. The MOX fuel fabrication facility would have been located at either the Hanford Site, INEEL, Pantex Plant, or SRS. All of these proposed missions and the *Tritium Supply and Recycling Programmatic Environmental Impact Statement* went to the SRS.

E.3 Past, Present and Reasonably Foreseeable Actions Adjacent to the Hanford Site

No major actions have been identified outside the Hanford Site boundary that would significantly contribute to environmental impacts of the proposed action. The Siemens Power Corporation currently operates six waste water lagoons to dispose of approximately 95,000 kg/day (25,000 gal/day) of effluent containing fluoride, nitrates, and minor amounts of radionuclides. This discharge is not considered during the analysis of cumulative environmental impacts, however, because the facility recently initiated a program to switch to a dry manufacturing system that will eliminate the waste stream. Siemens will complete conversion to the dry manufacturing system by 1998 and will phase out the use of lagoons completely by the year 2004 (TCH 1996b).

In 1996, DOE prepared an EA to address the transport of up to 5,120 m^3 (6,696 yd^3) of contact-handled low-level mixed waste from the Hanford Site to the Allied Technology Group (ATG) private gasification and vitrification building in Richland, Washington, for treatment (DOE-RL 1996). Treated waste would be returned to the Hanford Site for disposal. The waste would be staged to the ATG facility over a 10-year period. The building is on a 18.2 ha (45 ac) ATG site adjacent to ATG's licensed low-level waste processing facility approximately 0.3 km (0.2 mi) south of the 300 Area. The action by ATG is being undertaken as a private action in anticipation of future work for a variety of contracts, including DOE. The ATG facility is located adjacent to the Hanford Site boundary in an industrial area in the City of Richland. Effects of construction and overall operation have been evaluated in an EIS under the SEPA which was issued on February 23, 1998.

City and county planning officials were consulted to assess other potential actions outside the Hanford Site boundary. The actions identified are primarily road, bridge, and sewer system improvements that are likely to have only minor impacts themselves and are limited compared to

the large scale of actions associated with the proposed future land-use objectives. Ongoing economic and residential development in the region could contribute to cumulative socioeconomic impacts. However, as discussed in Chapter 5, there is considerable uncertainty associated with any analysis of such impacts, given available information on the scheduling of potential actions at the Hanford Site.

Land-use planning efforts for areas outside of and surrounding the Hanford Site are currently being undertaken by Benton, Franklin, and Grant counties; and by the City of Richland. These planning efforts will establish land uses that will be permitted by local governments in areas surrounding the Hanford Site. The City of Richland prepared a EIS under SEPA, finalized on August 27, 1997, that identified an urban growth area involving Hanford Site land in the vicinity of the 300 Area. A similar area, of varying size, is identified for Industrial use under all alternatives. The City of Richland's Comprehensive Plan is consistent with current and proposed future land uses at Hanford and DOE missions.

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